## REMARKS

Claims 1-28 stand rejected and remain pending in the subject patent application.

Claims 4 and 26 are being amended to correct typographical errors.

### Rejection Under 35 U.S.C. §112

Claim 9 was rejected because the term "the angular position" lacks an antecedent basis. In response that claim is amended to recite --an angular position of the member--.

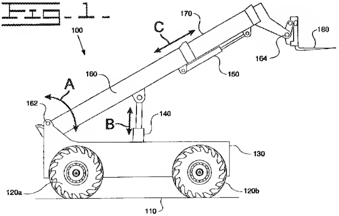
### Rejection Under 35 U.S.C. §102

Claims 1-7, 9-13, 15-18 and 20-28 stand rejected under 35 U.S.C. §102 as being anticipated by Brandt *et al.*

Both the present system and the one disclosed in the reference control linear extension of a boom and the up and down rotation of the boom, however they control that rotation in very different manners using dissimilar control methods and systems.

The rejection has failed to recognize a fundamental distinction between the angular velocity of the boom and the velocity of the actuator that pivots the boom. With reference to the below annotated copy of Figure 1 from the Brandt *et al.* patent, the angular velocity of the boom 160 is depicted by a curved line A, whereas the velocity of the hydraulic cylinder 140, which is a linear actuator that pivots the boom, is depicted by a straight line B.

FIG-1-



Although the boom's angular velocity and the actuator's linear velocity are related trigonometrically, that relationship varies constantly as the angle of the boom changes, thus specifying one does not directly specify the other.

This denotes the fundamental control distinction between the Brandt *et al.* system, which controls the boom based on angular velocity, that then is converted into fluid flow values for operating a valve, and the system in the pending claims that controls the boom by defining the velocity for the actuator, which velocity is used to control a valve.

Claim 1 specifies producing a command which designates a desired velocity that a point on the member (e.g. the tip of the boom) is to travel along a desired substantially straight line path, and then transforming the command into a desired first velocity of the first actuator which pivots the member. That transformation is not performed by Brandt *et al.* The passages in the prior patent cited by the rejection as allegedly describing this transformation merely describe converting the desired X-Y velocities of the fork 180 from Cartesian coordinates into polar coordinates that specify the angular velocity and the linear length velocity of the telescopic boom (col. 4, lines 5-9; Fig. 3, step 320). This produces angular velocity A and linear velocity C indicated in annotated Figure 1 above.

After being adjusted by a feedback circuit shown in Figure 3 of the patent, those velocities are converted into flow percentages that apportion fluid between the first and second actuators (step 360). The flow percentages merely determine the ratio of how much of the available hydraulic fluid flow goes to the first actuator 140 in comparison to how much of the available flow goes to the second actuator 150 to ensure that the fork 180 moves in the desired straight line. The Brandt *et al.* flow percentages do not indicate the absolute amount of flow to each actuator as the total available flow being apportioned

varies with changes in pump output, fluid consumption by other machine devices, and other factors. Since the absolute flow to each actuator varies, so too does each actuator's velocity, thus the flow percentage does not correspond to a desired velocity of the first actuator 140 that pivots the boom.

Therefore, nothing in the cited patent derives a velocity B for the first actuator 140. As a consequence, claims 1-4 are not anticipated by Brandt *et al.* under 35 U.S.C. §102.

Independent claim 5 first transforms a straight line motion command into an angular velocity and a length velocity for a machine member. Then that angular velocity is converted into a desired velocity of the first actuator that pivots the member. In contrast, the Brandt *et al.* patent teaches converting a desired angular velocity and a desired length velocity directly into <u>flow percentages</u> that apportion fluid between the first and second actuators 140 and 150 that pivot and telescope the boom (Fig. 3, step 360). Because those flow percentages do not define absolute flows, which dynamically vary due to pump output changes and changing fluid demands by other actuators, the Brandt *et al.* flow percentages do not specify a desired velocity for the first actuator 140. As a result, the reference does not have the converting step in claim 5, nor does it operate the first actuator in response to the velocity value produced by that step.

Dependent claim 10 further specifies deriving the length of the member by sensing the dimension <u>of the second actuator</u> which varies that length, and then converting the sensed dimension into the length of the member. In contrast Brandt *et al.* provides a length sensor 230 that directly measures the length of the telescopic member 170 of the boom (column 3,

lines 33-36). Nowhere in the reference is a dimension of an actuator sensed for this length determination.

Claim 15 states that sensing the first parameter, which in claim 12 denotes the angle of the member, is accomplished by sensing a dimension of the first actuator. In contrast, the Brandt system has an angle sensor 210 that directly senses the boom angle relative to the machine frame 130 (column 3, lines 30-33). Therefore, the reference does not teach deriving the actual boom angle by sensing a dimension of first actuator 140.

Claim 17 states that sensing the second parameter of the machine in claim 12, which produces a second signal denoting the length of the member, is accomplished by sensing a dimension of the second actuator. As noted regarding claim 10, the Brandt *et al.* system has a length sensor 230 that directly measures the boom length (column 3, lines 33-37). Therefore, nothing in the reference senses a dimension of the second actuator.

Claim 18 recites sensing parameters of the first and second actuators and deriving the actual velocity of each actuator from those parameters. Nothing in the Brandt *et al.* patent relates to deriving an actual velocity of the actuator 140 that produces an angular change of the boom. Instead the boom angle is sensed and then processed at box 355 in Figure 3 to derive <u>the actual angular velocity of the boom</u>.

Therefore, claims 5-7, 9-13, and 15-18 are not anticipated under 35 U.S.C. §102.

Independent claim 20, like claim 5 discussed above, specifies "converting the desired angular velocity for the member into a desired first velocity of the first actuator", which actuator alters the angle of the member. Because the Brandt *et al.* system converts the desired angular velocity of the member directly into a fluid flow percentage, not a

desired velocity for the first actuator 140, that reference does not teach the method in claim 20.

Dependent claim 21 calls for sensing a dimension of the second actuator which controls the length of the boom. As noted previously, the Brandt *et al.* system has a length sensor 310 that directly senses the telescopic length or extension of the boom member 170 (column 3, lines 33-37) and does not sense a dimension of an actuator.

Therefore, claims 20-24 are not anticipated by the Brandt *et al.* patent.

Independent claim 25 recites an apparatus that has a first converter which translates the angular velocity for the member into a first velocity at which the first actuator is to move and thereby control the angle of the machine member. As noted above, there is no corresponding converter in the Brandt *et al.* patent. Instead the patent teaches block 360 that transforms the desired angular velocity into an percentage of the available fluid flow that is to be applied to the first actuator. Nothing in that patent defines a velocity at which the first actuator 140 is to move. As noted previously, the patent's first actuator moves at a different linear velocity than the angular velocity of the boom that the actuator drives. As a consequence, claims 25-28 are not taught by the Brandt patent.

In light of the significantly distinct method and apparatus described in the Brandt *et al.* patent, claims 1-7, 9-13, 15-18 and 20-28 are not anticipated under 35 U.S.C. §102.

**Rejection Under 35 U.S.C. §103**

Claims 8, 14 and 19 were rejected under 35 U.S.C. §103 as being unpatentable over Brandt *et al.* in view of Igarashi *et al.*

As noted previously with respect to claim 5 from which these claims depend, the Brandt *et al.* system does not convert the desired angular velocity of the member into a desired first velocity of the first actuator that pivots the member. Nor does Igarashi *et al.* disclose this feature. As a result, claims 8, 14 and 19 are patentable for the same reasons as claim 5.

In addition, the Brandt *et al.* patent describes a telehandler having a boom 160 with a telescopic member 170 that only moves linearly with respect to the boom. In contrast Igarashi relates to an excavator that has a boom 1 and an arm 2 that only pivots with respect to the boom and does not telescope. The dissimilar components and dramatically different motion of the two machines make the equations for Igarashi excavator inapplicable to the Brandt *et al.* telehandler.

Furthermore, the specific equations contained in claim 8 are significantly different from the equations recited in the Igarashi, *et al.* patent. The presently claimed equations among other factors, include the pitch angle of the machine on which the member is mounted and the angular pitch velocity. These terms are not present in the patent's equations. Another distinction is that equations in Igarashi, *et al.* use the different angles between the boom, arm, and bucket of an excavator, which angles are not used in the equations of claim 8.

Therefore, claims 8, 14 and 19 are patentable under 35 U.S.C. §103.

**Conclusion**

In view of these significant distinctions between the subject matter of the present claims and teachings of the cited patents, reconsideration and allowance of the present application are requested.

Respectfully submitted,
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